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SURVEY OF DDR's TECHNICAL AND SCIENTIFIC PUBLICATIONS

This survey is arranged in main sections as follows:

- Section A.- TRANSPORTATION
- Section B.- AERONAUTICS
- Section C.- CHEMICAL ENGINEERING
- Section D.- ELECTRICAL ENGINEERING, RADIO AND TELEVISION
- Section E.- MACHINE ENGINEERING, GENERAL
- Section F.- WELDING AND PRODUCTION ENGINEERING
- Section G.- MINING AND ENERGY
- Section H.- APPLIED RESEARCH

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Note.- The abbreviations indicated in the list of the original German titles of all the publications included in the survey are used as reference symbols. The figure behind the symbol is the publication number, and the number then following is the page number in the publication concerned. "Lit" is to indicate that not the original report is at hand, but only a brief extract from the documentation pages.

  
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List of publications included in this survey.-

1. Die Technische Gemeinschaft . . . . .	TG
2. Maschinenbau-Technik . . . . .	MT
3. Der Maschinenbau . . . . .	Masch
4. Technisches Zentralblatt/Maschinenwesen . . . . .	ZM
5. Kraftfahrzeug-Technik . . . . .	KT
6. Deutsche Eisenbahn-Technik . . . . .	Esb
7. Schiffbau-Technik . . . . .	SchT
8. Fertigungs-Technik . . . . .	FT
9. Schweiss-Technik . . . . .	Schw
10. Deutsche Elektro-Technik . . . . .	ET
11. Nachrichten-Technik . . . . .	NT
12. Radio und Fernsehen . . . . .	RuF
13. Feinmechanik und Optik . . . . .	FuO
14. Bergbau-Technik . . . . .	BT
15. Bergakademie . . . . .	BK
16. Energie-Technik . . . . .	En
17. Silikat-Technik . . . . .	ST
18. Plaste und Kautschuk . . . . .	PK
19. Chemische Technik . . . . .	CT
20. Wasserwirtschaft und Wasser-Technik . . . . .	Was
21. Experimentelle Technik der Physik . . . . .	ExTP
22. Urania . . . . .	U
23. Sport und Technik/ Motorsport . . . . .	SpT-Mot
24. Sport und Technik/ Seesport . . . . .	SpT-See
25. Sport und Technik/ Flugsport . . . . .	SpT-Flug

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Section A.- TRANSPORTATION

A-1. Methods of operating internal combustion engines under partial load KT-6-178 by Dipl.Ing.Günter Hauser; Report from the Institute for Internal Combustion Engines and Automotive Engg., Dresden Technological Institute.-  
The improvement of fuel consumption of otto engines under partial load by "backpush" and compression control has been treated under the above headline in the foregoing numbers. (See April Survey, p.2, par.A-2). Tests have also been made with preheating the fresh gas mixture by exhaust heat, and with a system allowing to add a variable part of the exhaust gases into the intake stream directly, so that the optimum filling rate is maintained even when the throttle is partly shut. The respective tests and testing arrangement are described, and illustrative diagrams as well as resulting operation diagrams and characteristics are given. Preparatory experiments have shown that careful carburettor adjustment results in considerable savings already. It is stated that the preheating device employed yielded insufficient results, and that the above indicated method of exhaust control causes ignition trouble if ignition timing is not influenced at the same time. It is suggested that further work in this field must be directed to an improved method of exhaust control and the development of a simple mechanic means for altering the compression ratio of otto engines during operation.

A-2. Supercharged automotive diesel engines KT-6-186 by Dipl.Ing. G.Kranold, Berlin-Biesdorf.-  
After a treatment of the fundamentals of supercharging, the author discusses the special problems adhering to supercharging of automotive diesel engines. The advantages of turbo superchargers as compared to mechanically driven units are outlined, and problems governing the design of exhaust turbine units discussed. Current general operation data for this type of machines such as peak r.p.m. rates of exhaust turbines, temperature limits etc. are also included. The author then explains why supercharging is inappropriate for automotive type two-stroke diesel engines which are normally operated at largely varying speeds. Contribution to be continued in the next number.

A-3. The development of UdSSR's motor-cycle industry KT-6-189 by Ing.Frederyk Blumke; taken from "Technika Motoryzacyjna", Warsaw, no.10, 1954.-  
A short historic survey on the development of the Russian motor-cycle is followed by a treatment of USSR's current designs in conventional and sprting models. Diagrammatic views of some of the types named, plans of two special racing engine designs, and tables containing technical data of the types now existing are included. It is claimed that a modern design had been developed by a group of Soviet engineers under Ing.Lwows in 1924 already, which is said to have had rear wheel suspension, slanted cylinder arrangement, and a number of other modern features of design as discovered much later in the other countries.

A-4. Construction and performance of modern fluid drive KT-6-198 Condensed from "Motorrundscha mit NKZ", Frankfurt, no.11, 1953.-  
Description of the Borgward 52 type hydra-matic drive which is used for the Hansa 2400 model passenger car. Some illustrations are included

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A-5. Tatra 137 - a new Czechoslovakian truck model K-6-200  
by Z.V.Kleinhampl; from "Motorwelt", Prague, no 24, 1954.-

The prototype model of the new 7-ton Tatra 137 type truck was put in trial operation late in 1954. The new design includes some remarkable technical features and is based on the earlier Tatra 111 model. Special care is given to high performance qualities, long service life, operating security, and maximum comfort to the operator. The truck is powered by a V-arranged 8-cylinder aircooled diesel engine for an output of 160 PS at 2000 r.p.m. (if not supercharged). The single-disk dry clutch is actuated by a hydraulic system, and mounted to the flywheel as usual. The transmission is a combination of an ordinary 5-speed gearbox and an auxiliary transmission and is actuated by a compressed type preselecting system. The transmission is mounted below the platform in the middle of the vehicle so as to be easily accessible for service and repair. Some illustrations and technical data are included.

A-6. New Soviet buses KT-6-203

Two models of the new Soviet SIS-127 type bus are presently being road-tested on the Moscow - Simferopol autobahn line. Total length of the vehicles is 10 meters. Power is supplied by a rear mounted 180-PS diesel engine, securing a speed maximum of 100 km/h.

A-7. Technical details of the IFA-Phänomen type truck chassis  
KT-6-204

The above 2-ton truck is constructed by VEB Kraftfahrzeugwerk Phänomen, Zittau. The vehicle may be equipped with a 55-PS Granit 30 K type gasoline engine, or a 52-PS Granit 32 type diesel engine, alternatively. Four wheel drive may be provided for special applications. Some technical data, cutaway view of front axle arrangement, and other illustrations are included.

A-8. New Soviet passenger car models KT-6-214 and SpT-Mot-10

Total views and some technical features of the "Model 402, Wolga" and "Pobeda M 72" passenger cars, which are to appear on the market early in 1956. The design of the Wolga model is based on an earlier Pobeda model, while the second type has hydraulic transmission similar to the "GAS-69" type car. Both cars were developed by the Molotov Automobile Works, Gorki, USSR. A new model ("Ukrainez") of the two-seated M-72 type has also been developed by the same factory.

A-9. Central collecting railway freight stations Esb-6-223  
by Dr.Otto Hochsteiner and Prof.Dr.Gerhart Potthoff, Dresden.-

The treatment investigates the problem of optimum distribution of collecting stations within an area containing non-centralized railway freight sources throughout. It is distinguished between cases with and without preliminary shunting at the sites of factories, collieries, or other freight sources. The results are represented by elliptic integrals, the approximate solutions of which are listed in tables. It is then investigated, and illustrated by examples, to what extent repeated shunting and appropriate directing of freight influences the time required for rail transport. The above problem is important for transportation off coal districts and similar.

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A-10. Diesel powered multiple-unit cars of the Deutsche Reichsbahn  
Esb-6-231 by Ing. A. Wundrack, Berlin.-

Thorough description of the above four-unit cars which are made by Ganz, Waggon- und Maschinenfabrik, Budapest. Technical data and numerous exterior and interior views are included (see also front cover, Esb-6). The units are propelled by two 450-PS V-arranged 12-cylinder Ganz-Jendrassik diesel engines of the XII Jv 170/240 type. The drive is accomplished by a five-speed and reversing transmission of the constant-mesh type, and the axles are roller bearing supported. No information is given by the report as to whether, and to what extent, the units are now in service in the DDR.

A-11. Inherent resistance of steam locomotives Esb-6-237  
by Obering. Friedrich W. Eckhardt, Niederlehme.-

The locomotive characteristics of steam locomotives give the indicated and effective power as a function of boiler load and operation speed. These values have been experimentally established for a number of standard type locomotives of the Deutsche Reichsbahn, so that the value of inherent resistance, which includes friction losses of bearings and drive, air resistance etc., may be easily found by subtraction. The treatment discusses an improved form of the Strahl equation for calculating locomotive inherent resistance which has been adapted to modern engines by the author. By the use of this equation it is possible to calculate the resistance of any locomotive from a number of basic data. The different components making up the total difference between indicated and effective power are shown by graphs as a function of speed. A special section is dedicated to air resistance of streamlined locomotives, and a special term is presented.

A-12. Ultrasonics serve DDR's railways Esb-6-249  
by Ing. Ernst Karl Reyer, Halle-Saale.-

The author outlines the importance of non-disturbing material testing for safety of rail traffic. The test methods suitable for finding smallest surface cracks and other defects of rail and rolling material are named. Special consideration is given to the ultrasonic methods (ultrasonic piercing method and ultrasonic reflection meth.) which are superior to roentgenological inspection for many purposes. Some ultrasonic impulse units for testing are shown by illustrations, and the methods themselves are thoroughly described. One diagram of a standard type testing quartz and pictures of special designs in testing quartzes are included. The author then comes to the different applications such as testing axles and bars of circular or rectangular section, testing of sheet and tubular material. Some examples of characteristic screen images are shown. The treatment is to be continued in the next number.

A-13. CSR railway electrification Esb-6-256-Lit

According to a decision made during the X. congress of the Communist Party of the CSR, the electrification of CSR's railways will start at the Praha - Kosice line which represents 9% of CSR's total railway lines, carrying 40% of total rail traffic. It is demonstrated by figure material, that the electrification of this line will save 1000 to 1950 tons of coal every year. It is also explained that the capacity now required for transporting the locomotive fuel to stations and depots along the line will become available for other purposes. General operating expenses will be reduced by 25 to 40% according to Soviet experiences.

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A-14. New Soviet electric coal car for open-pit mines Esb-6-256-Lit  
Condensed from the Soviet publication "Mechanization of Heavy Work", Moscow, no.11, 1953.-

Diagram and technical data of the above vehicle which consists of a small electric locomotive connected with a semitrailer dump car. The DC electromotoric drive is evenly distributed to each of the six axles. The vehicle has a weight of 90 tons (unloaded) and a carrying capac. of 60 tons. Electric resistance braking is provided in addition to conventional air brakes. Since indirect control is employed for the vehicles, more than one may be coupled together, and operated by one operator. The dump swinging device is actuated by compressed air which is supplied by a special compressor. The main advantages of the new design are its increased climbing ability (up to 100 ‰) and a considerable saving of dead weight and, as a result, of electric energy.

A-15. Roller bearings for Soviet locomotive Esb-6-257  
Condensed from "Information Bulletin for Machine Building", Moscow, no.8, 1954.-

In the years of 1951 through 1952 the Kolomensk Locomotive Works have equipped a number of series L locomotives with dual tapered roller bearings for trial purposes. The respective design and experiences gained from trial operation are explained, and also the improvements which have lead to a more satisfactory design. A design diagram of the improved design is contained.

A-16. Installation for drying freight cars Esb-6-258  
From "Gudok", Moscow, no.297, 1954.-

Transportation of grain in closed freight cars requires that the cars are thoroughly cleaned and dried prior to use. The report describes an installation employing a modified locomotive as a stationary cleaning water pump and drying air heater. It is said that the drying time required for a freshly rinsed car is no more than 7 to 9 minutes. The installation is already in use at the Barnaul railway maintenance shops, USSR.

A-17. Cargo vessel "Stralsund" of the VEB Deutsche Seereederei, Rostock  
SchT-6-162 by Hans Neumann, Wismar.-

The above motor vessel was constructed by VEB Mathias-Thesen-Werft, Stralsund, and has recently returned from her first voyage on January 17, 1955. The ship has 1106 BRT and is powered by a 980-PS diesel engine, driving the propeller shaft over a transmission. The general design, equipment and interior arrangement, and the machinery are more closely described. Diagrammatic plans and other illustrations are included.

A-18. Calculation of girder grillages SchT-6-169  
by Ing. Walter Haberstroh, Rostock.-

Prof. Dr. Biermann shows a method of calculating girder grillages with more than one knot points and different dimensions of all elements in "Schiffbautechnisches Handbuch" (Naval Engineer's Handbook). The author has found that the above method may be largely simplified for many special cases. Furthermore, a method for calculating an entire system of girders with knot joints of more than two girders which may be supported or non-supported after a uniform system is demonstrated. Different special cases are more closely considered.

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A-20. Design and construction of deck machinery SchT-6-176  
 by Ing. Paul Ross and Ing. Christian Fleischer, Rostock.-  
 This is the third contribution under the above headline, and is dedicated to a thorough treatment of fishing-net winches on ship-board. Initially, the author discusses general features of this type of machinery which had to be switched entirely on diesel-electric drive when diesel engines more and more replaced steam propulsion of fishing craft. Normally the diesel-generator set is located in the engine compartment and operated at a constant economical r.p.m. rate. Leonard wiring is employed to secure elastic regulation of the deck-mounted winch. The author then describes several designs of winches which were constructed and mounted in DDR's shipyards within the last years, including data and illustrations. The respective specifications for inspection and approval as issued by DSRK are presented.

A-21. New model series tests of the Washington Taylor-Model-Basin  
 SchT-6-187-Lit Short report on an extensive test program currently under way in the above named institute. The results of the tests, which extend over several years already, will supply material for the prediction of the resistance values even of modern ship designs.

A-22. Industrial electronics in modern engineering Esb-6-241  
 by Ing. Gerhard Selge, Berlin.-  
 The steadily growing importance of electronics in all fields of engineering is outlined and some interesting applications, such as h-f heat and its use, electronic control of electric motors, electronic control of welding machines, and ultrasonics are mentioned, and their interest for railway engineering is discussed.

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Section B.- AERONAUTICSB-1. Winged automatic guidance missiles SpT-Flug-10-17

This is an unclassified article adapted for the intellect of laymen and "comrades" of the GST organization, which is the East German equivalent of the Polish "League of Soldiers' Friends". Basic facts about jet propelled pilotless long distance weapons are explained, but no data nor details of any kind are given. One cutaway view of a test unit for aerial firing and a picture showing parachute landing of a test missile over the "target" area after a test flight are included.

B-2. Flying at supersonic speed U-6-212 by Roman Frydrych, Berlin-Lankwitz, 79b Sondershauser Strasse.-

This is an introduction into the principles of jet propulsion and the problems of supersonic flight. The concepts of mach number, shock wave, and sound barrier are explained, and some illustrations taken from other publications are included.

B-3. CSR's first helicopter Masch-6-143

According to a short report, the prototype of CSR's first helicopter, which is to go in series production in the near future, has recently been completed by CSR's airplane works. It is claimed that the results of test flights were above world standards. The craft will be used for training purposes and also for protecting ~~xxxxx~~ forests etc. against harmful insects.

B-4. USA builds supersonic wind tunnel Masch-6-143

Short report, telling that a flow rate of 1,300 m/sec may be produced inside the above wind tunnel as constructed in the USA. It is said that close to 6,000 kg of water are required every minute for cooling the tunnel.

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\* Section C.- CHEMICAL ENGINEERING

C-1. Production methods, properties, and quality of liquid engine fuels KT-6-194 by Prof. Dr. Alfred Diederichs, "Merited Inventor", Freiberg.-

This is the last of a series of fundamental treatments under the above headline, dealing with the synthetic hydrogenation methods and its products. The I.G. Bergius process (hydrogenation of coal, tars, and oils) and the total synthesis by reduction of carbon oxide after Fischer-Tropsch are described. The processes are illustrated by block diagrams. DDR's lignite base gasoline obtained by hydrogenation has octane ratings of 69 or less, so that anti-knock admixtures are required for making high grade products. The importance and the properties of plumbic tetraethyle are mentioned in this connection. The addition of TET may result in spark plug trouble at modern highly developed engines, so that special additives (organic phosphor compounds) are sometimes used as a remedy. The author doubts, however, that there is a real need for such measures at the present time.

C-2. New system for numbering the atoms in condensated cyclic structures CT-6-313 by A. P. Terentjew, A. N. Kost, and A. M. Zukermann, Moscow; Report from the Faculty for Chemistry of the Moscow Lomonossow University.-

A new ring indexing system for condensated cyclic structures is offered and discussed. The system is independent of the projection of structural formulas and is determined by a single objective factor, the molecular structure, and may therefore be applied both to carbocyclic and heterocyclic structures. Structures of this type may be easily designated by indicating the non-linear bonds between the atoms, thus giving a fundament for a well-defined systematic nomenclature of polycyclic compounds.

C-3. High Temperature medium pressure hydrogenation of light lignite oils CT-6-316 by Rudolf Schmidt and Gerhard Gunther, Rehmsdorf nr. Zeitz; Report from VEB Hydrierwerk Zeitz.-

Large ~~xx~~ scale processing of light lignite oils is generally carried out by acidic raffination or by high pressure hydrogenation at the present time. Since both the above methods are disadvantageous in some respects, the investigations at hand are to combine their positive features into a new method, which is called HTM hydrogenation. The development of a useful laboratory method and its application to large scale processing are described, and results obtained are given. The optimum catalyst is named and the properties of the resulting engine fuels are listed. It is said that the reaction is sufficiently exothermic to be self-maintaining. The method has been introduced in the above factory already, although the light oils have a tendency for coking at temperatures between 200 and 360° centigrades, which renders certain difficulties.

C-4. On the use of octamethylcyclotetrasiloxane as a solvent in kryoscopic determination of molecular weights CT-6-333

by Helmut Reuther, Dresden, and Elfriede Rosenbaum, Radebeul; Report from the Institute for Silicon and Fluorocarbon Chemistry, Radebeul nr. Dresden.- Kryoscopic investigation of monomere and silicon-organic substances oftentimes yields insufficient results, if the conventional solvents (benzol, cyclohexane) are employed. The treatment discusses the question whether a suitable solvent for the above determination method has been found with octamethylcyclotetrasiloxane.

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The determination of the kryoscopic constant of the compound is described, and report is made on experiences gathered during molecular weight ~~etc~~ determinations with the new solvent.

C-5. Determination of the emulgator contents of polyvinylchloride powders CT-6-336 by Karl Schwertassek, Brno, CSR.-

Emulgation polymerization is mainly employed for the production of PVC powders. Polymerization is effected by a watery ~~emulsion~~ emulsion of the monomere. Emulsions are prepared by the aid of emulgating agents (emulgators), such as fatty alcohol sulfonates, condensation products of fatty acid, sulfonic acids of higher hydrocarbons, and others. It has been found that the properties of the final raw product, which is oftentimes gained by sole vaporization of the water without the emulgator being removed, depends on the emulgator contents. The author explains the method of methanole extraction, which belongs to the direct determination methods, and also the method after F.Kainer. For more exacting demands, a special method of combined extraction is described.

C-6. Progress in photography CT-6-340 by Kurt Meyer, Wolfen.-

Basing on the statement that profound knowledge of the method of photography, the properties and applications of photographic materials, and their handling must be expected of every scientist and engineer, the author gives a thorough survey on the entire field of photography. The following is included:

- a) Fundamentals of the photographic process;
- b) Photographic coatings;
- c) Modern theory of the primary photographic process;
- d) Progress in emulsion technics;
- e) Progress in the optical sensibilization of halogen-silver emulsions;
- f) Properties of photographic materials;
- g) Special applications of photographic materials;
- h) Development of photographic materials;
- i) Latensification and
- k) Methods of coloured photography.

C-7. Chemical engineering at the 1955 Leipzig Spring Fair CT-6-349

This is a comprehensive illustrated report, classified into chemical industry in general, pharmaceuticals, new developments in laboratory technics, and installations and equipment for chemical plants. It is appreciated that achievements of West Germany's chemical industry were also represented at the exhibition, so that suggestions and products will be available to the DDR.

C-8. Geochemistry of isotopes CT-6-362 by A.P.Winogradow

Condensed from "Reports of the Academy of Sciences of the USSR", Moscow, no.24, 1954.-

The report is to demonstrate that the isotopic composition of the earth is subject to continuous changes, and that substitution reactions going on in the biosphere result in an increase or decrease, respectively, of isotopic concentration. It is said that a number of these reactions is greatly influenced by the fauna of the earth. Alterations in the isotopic structure of the earth offer an ideal means for geologic investigations with respect to temperature and time.

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- C-9. Resisting properties of Ni-Al<sub>2</sub>O<sub>3</sub> contact improved through briquetting CT-6-367-Lit From "Reports of the Acad. of Sc. of the USSR", no. 100, 1955.-  
The above catalyst is used for the dehydration of ethyl alcohol. Its resisting properties are improved by 100% if the aluminum oxide is pressed at 20,000 kg/sq.cm. Investigations have substantiated the theory that the formation of a polymere film at the surface of the contact material is responsible for this increase.
- C-10. Polyamide fibers refined by the action of phenoles CT-6-369-Lit by W. Tetjuschkina, A.B. Pakschwer, and S.S. Flolow, USSR.- Phenoles not only used for theoretical research in polyamide fibers, but also for technical refinement of perlon fibers. When perlon synthetic silk is treated with watery ~~XXXXXXXX~~ phenole solutions, the polyamide molecules are somewhat loosened in their structure, which results in an alteration of the original length of the individual fibers. The method serves for improving the mechanical properties of the thread as well as dyeing properties. More detailed information is given.
- C-11. Synthesis of optically pure alpha-polyglutamine acid of the L and D series simplified and improved CT-6-369-Lit From "Acta chim. Acad. sic. Hung", no 5, 1955.-  
Alpha-polyglutamin-acid-polymethyle ester of the L and D series yields optically pure alpha-polyglutamine acid by saponification with a NaOH solution under the presence of Cu(OH)<sub>2</sub>. The method yields a product with considerably increased molecular weight, if compared with acidic hydrolysis or other methods.
- C-12. Chemical colloquies held by East German universities CT-6-372  
Extracts of the following lectures held during chemical colloquies of the universities named:  
a) Ernst-Moritz-Arndt-Universität, Greifswald, Nov. 25, 1954: "Comparison of strain series in different solvents", H. Strehlow, Göttingen;  
b) Martin-Luther-Universität, Halle-Wittenberg, Dec. 3, 1954: "The part played by chemistry in biologic research", K. Mothes, Gatersleben;  
c) Friedrich-Schiller-Universität, Jena, Dec. 15, 1954: "The alcoholysis of esters of toluol ~~xxxxx~~ sulfonic acid", W. Hüchel, Tübingen;  
d) Karl-Marx-Universität, Leipzig, Dec. 14, 1954: "On the validity of the Lambert-Beer's law", W. Luck, Ludwigshafen.
- C-13. New members of East German Academy of Sciences CT-6-379  
Prof. Dr. Otto Emicke, head of the Freiberg Research Institute for non-iron metals, and Prof. Dr. Hans Knoell, director of the Institute for Mikrobiology and Experimental Therapy, VEB Jenapharm, Jena, were nominated ordinary members of the (East) German Academy of Sciences, Berlin.
- C-14. Investigating the mechanism of the vulcanization process of caoutchouc by means of radioactive sulphur PK-6-121 by S.E. Bressler, W.J. Prjadilowa, and W.A. Chainman; after "Journal techn. Phys.", Moskow-Leningrad, no. 24, 1954.-

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According to the prevailing theory, the process of vulcanization is explained as a bridge formation between the linear macromolecules by the deposition of one or more sulphur molecules at the points of dual bindings. It is not known, however, why no other elements are able to yield useful vulcanization products. Another question not yet clear is that of the ratio between so-called "free" and "bound" sulphur. Finally the question of how to explain the kinetics of the vulcanization process itself is still unsolved. Under consideration of the above questions, the authors have made quantitative investigations of the process of vulcanization. Radioactive sulphur was used for this purpose, and diffusion measurements were mainly carried out. The methods employed are more closely described. The resulting theory is given.

C-15. USSR's plastics industry PK-6-122 Condensed from "Chemical Industry", Moscow, no.1954.-

Short report on the postwar development of USSR's plastics industry. It is said that h-f heating is more and more employed, and that the aim of future development is large scale automatization in plastics working, so that 10 to 12 presses will be operated by no more than two workers. The foundation of a central designing bureau employing first experts is suggested.

C-16. On the influence of phenoles on rubber mixtures PK-6-123

by G.Hofmann and I.Patzak; Report from the research and developing division, VEB "Gummiwerke 'Elbe'", Wittenberg.- Since some typical plastizisers for caotchouc contain different quantities of phenoles, a number of these compounds has been tested with respect to their effects on non-vulcanized mixtures of Buna S 3 material and P 1250 type lamp black, and on the respective vulcanization products. The most characteristic property found is the age-hardening of non-vulcanized mixtures, which is proved by comparison with different phenole ethers producing a lesser degree of age (after-) hardening. Furthermore, the vulcanization properties have been examined, and the positive influence of phenoles and phenole ethers has been stated. The treatise ~~ix~~ contains graphs and tables.

C-17. Polymerization of methylmethakrylate under the presence of coloring substances PK-6-131

by Ing.Z.K.Jelinek, Pardubice, CSR; Original report from the research institute for organic syntheses, Pardubice-Rybitvi, CSR.-

In coloring polymethylmethakrylate during the polymerization process, the influence of the coloring matter on polymerization and also the effects of polymerization conditions on the coloring matter are of fundamental importance. It is said that non-peroxidic initiators are best suited for this method. The theoretical background of in-process coloring and experiments carried out by the authors are thoroughly treated.

C-18. Plastics industry at the 1955 Leipzig Spring Fair PK-6-135

Continued from PK-5 (see May Survey, p.6, par.C-1).

In addition to the fields of plastics engineering already covered by the first part, the following is regarded in the continuation at hand:

- a) Epoxyde resins
- b) Non-saturated polyester resins
- c) Diisocyanates
- d) Foam plastics
- e) Safety glass and similar products.

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C-19. Annual Meeting of the German Academy of Sciences PK-6-139

In connection with the above annual meeting, a classified conference on "Fibers of Synthetic High Polymers" was held in Berlin between March 31 and April 2, 1955. The conference was attended by scientists from Western Germany, USSR, and other eastern countries. Presiding: Prof. Dr. E. Correns.

Of the lectures held during the conference, the following short reports are presented:

- a) Dr. F. Moll, Schkopau: Experiences gained in the development of a production method for spinneable polyakrylnitrile.
- b) Dr. A. Hunyar, Teltow-Seehof: The influence of the polymer-homologue distribution wideness on production and properties of polyakrylnitrile fibers.
- c) Dr. Ludewig, Schwarza: Fibers of trelon-group mixed polyamides.
- d) Prof. Dr. O. Wichterle, Prague: Fast polymerization of laktam.
- e) Prof. Dr. Korschak, Moskow: The reaction mechanism of condensation.
- f) Dr. W. Griehl, Teltow-Seehof: The distribution of molecular weights of polycondensation products.

C-20. On the constitution of glass ST-6-235

I. Schulz and W. Hinz, Berlin; Report from the institute for applied silicate research, director Prof. H. H. Franck.-

Paper chromatographic examinations with binary phosphate glass have been carried out with the aim of obtaining experimentally founded facts for the judgement about one of the prevailing theories on the structure of glass. The results support the conception of Zachariassen, according to which the structure of glass is similar to that of crystals. It is found very probable that this concept not only applies for pure glass oxides, but also to vitrifiable compounds having chain structure instead of a structure of three-dimensionally combined polyhedrons.

C-21. Standardization of the silicate analysis discussed ST-6-241

Dr. Martin Miels and Gerhard Schering, Meissen.-

This is the second part of a discussion under the above headline. Basing on records of laboratories concerned with silicate analyses, the applicable procedures of analysis are treated in detail. A scheme is drawn up suggesting how standardization may be accomplished.

C-22. The hydrocyclone as a separating device for chalk, kaolin, and clay slime ST-6-247

by Karl Baumann, Dresden; Report from the Dresden Institute for Applied Mineralogy, State Commission for Mineralogy.-

Experiments with glass cyclones have resulted in a new construction of the above named institute. The discharge of the new type hydrocyclone has been elongated to exclude air. The new construction has proved to be useful for separating the slime of chalk, kaolin, and clay. By six hydrocyclones combined into one unit, the clay substance ( $Al_2O_3$ ) can effectively be enriched. A generally applicable nomogram chart for calculating the dimensions of hydrocyclones is included.

C-23. Observations made during the aging process of glass batches

S. Schelinski, Weisswasser (Oberlausitz); Report from the Inst. VEB Central Laboratory of Glass Industry, Weisswasser.-

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Investigations in the aging process of glass batches have been made by measuring plasticity,  $p_f$  value, and shrinkage of the material. The author describes the plasticity measuring methods employed.

C-24. Economy of the two cement dressing methods compared ST-6-255  
O.Voigtlaender, Dessau.-

According to the author's opinion, the former superiority of the wet process has been overcome by the method of pneumatic mixing of the raw slur which proves the economic advantages of the dry process. To bring this out more clearly, a comparison between two modern portland cement works of an annual capacity of ~~xxx~~ 200,000 tons each is made.

C-25. Dependence of the grinding efficiency on the filling rate of tube mills K.Jakob, Glöthe.- ST-6-260

By evaluating the theoretical knowledge ~~xxxx~~ and practical experiences, the most advantageous filling rate with regard to the specific grinding capacity in kg/kWh was found to be 0.2. The most economical technical filling rate is said to be 0.28.

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Section D.- ELECTRICAL ENGINEERING, RADIO AND TELEVISIOND-1. Frequency warping in LC oscillators NT-6-250

by E.-G. Woschni, Dresden; Report from the Instt. for h-f Engng. and Electron Tubes, Dresden Technol. Instt.-  
The comparison principle is oftentimes used for frequency measuring. At this method, the output voltage of the oscillator to be measured is mixed with that of a frequency normal, and the difference frequency is measured. Optimum accuracy is obtained when the difference frequencies are small. The results are falsified by the effect of frequency warping due to mutual influence between the measured object and the frequency normal, which may even lead to complete synchronization in extreme cases. A method for calculating this phenomenon by means of a differential equation is derived, and maximum permissible values of difference frequencies for given values of required accuracy and logging wideness are established.

D-2. DDR's teletyping network NT-6-254 by F. Stell, Berlin;

Report from the Instt. for Postal and Telephone Engng., IPF, Berlin.-  
DDR's teletyping network will be switched from manual connection to automatic selection this year. The contribution gives a survey of the development in this field and an outlook on the future. Teletyping wiring principles and some problems of management are more closely considered. Diagrams showing the state of DDR's teletyping network in 1944 and 1952 are included. The contribution is to be continued in the next number.

D-3. Calculation of frequency-selecting low frequency amplifiers

NT-6-260 by J.G. Kotschinew, Leningrad; Translated from "Elektritschestvo", no. 4, 1954.-  
The contribution is said to be especially interesting for those concerned with electric control and regulation. Amplifiers employed for regulating and control wirings are oftentimes designed as frequency-selective units in order to remove compensation difficulties caused by the regulated quantity containing harmonic waves. The treatment covers analytic investigation of the properties of the means for frequency selective counter-coupling used for this purpose.

D-4. Graphical wave resistance determinations of biquadratic coaxial cables NT-6-263 by G. Emmrich, VEB-Works for Communication

Engineering, "WF", Berlin-Oberschöneweide.-  
The treatment describes a method for determining the wave resistance of biquadratic coaxial cables as a function of the ratio of the sides, working with graphical evaluation of potential line determinations within the electrolytic trough. Diagrams showing potential distribution within sections of different types of biquadratic coaxial cables and graphs demonstrating wave resistance values for different side ratios of three different types are included.

D-5. Noise suppression in pulse code modulation NT-6-243

by K. Steffenhagen, Berlin.-  
Basing on the equation  $s = 1 + S/N$ , PCM is in the position of adapting the pace number  $s$  to the noise interval  $S/N$  of any transmission code. The equation given may be regarded as a kind of transformation, where the quotient  $S/N$  is a predetermined value. It follows then that band expansion at small pace numbers  $s$  and band compression at an increase of the pace number are equivalent possibilities. The treatment is especially concerned with noise suppression of expanded-band PCM on wireless lines.

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D-6. Transistor conference NT-6-267

The above conference was organized by the research division, Werk für Bauelemente, Teltow near Berlin, and was held to give information about physics and technics of transistors to the participants. The following lectures were delivered during the meeting:

- a) Dr. Falter: Present state in transistor technics;
- b) Dr. Blankenburg: Transistor physics;
- c) Ing. Schaffer: Transistors as construction elements in low frequency engineering;
- d) Ing. Bottke: Selected application examples of transistors in h-f-engineering;
- e) Ing. Walles: Transistor measuring technics;
- f) Dipl. Phys. Schmidt: Photographic effects in semi-conductors (Germanium and Silicon)

The program of the meeting also included demonstrations of the following: Small type all-transistor receiver, transistor photo-electric cell, and the improvised loudspeaker system used during the meeting, which included a microphone modulating an ultra short wave transistor transmitter the signal of which was received by a conventional type receiver.

D-7. Television conference held in Leningrad, USSR NT-6-267

The conference, which is intended to be repeated annually, was held in Leningrad, December 1954. 26 lectures were dedicated to the exchange of experiences between TV centers and industry. The following subjects were treated:

- a) Operational experiences of the TV centers;
- b) Colour television;
- c) Industrial applications;
- d) TV range investigations.

An agreement was made at the end of the meeting, covering the development of an improved colour TV system, improved studio equipment, and an improvement of industrial production both with respect to quality and quantity. The publication of a special classified paper was suggested, which is to cover the fields of television and electronics.

D-8. Galvanic elements for portable communication units NT-6-268

by H. Winkler; Report from "VEB Entwicklung für Kable- und Apparatbau", Leipzig, Section for Accumulators and Galvanic Sources, Zwickau.-

Initially the concepts and terms of this field are explained, and a systematic survey of power characteristics of the most important primary and secondary elements is given. Furthermore the treatment discusses new types of primary and secondary elements, not basing on the principles of galvanoelectric sources. Late experiments of the Bell Laboratories are mentioned in this connection.

D-9. Coupling of h-f-transmitters NT-6-276 by F. Lang, Berlin.-

The treatment summarizes the conditions to be observed when h-f-transmitters are to be coupled together. The present state in this field is outlined by a discussion of the respective wirings now known. A survey is given of factors important for satisfactory performance of coupled transmitters, such as careful dimensioning and adapting of phase rotating unit, phase regulation, and transformers. Calculation is facilitated when the coupling circuits are considered as a quadripole with losses adhering.

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**D-10. Industrial survey NT-6-282**

Pictures, short information, and some technical data of the following units produced by DDR's VEB factories:

- a) Field intensity meter (VEB Funkwerk Dresden)
- b) MPG 1 material testing unit ( " " " )
- c) TFS 1 sound frequency spectrometer (VEB Funkwerk Dresden)
- d) Photographic accessories for cathodray oscillograph (VEB-RFT-Gerätewerk Zwicknitz)
- e) Type MV 1 electron tube voltmeter (Clamann & Grahmert, Dresd.)
- f) Type MV 9 DC electr. tube voltm. ( " " " )
- g) Type GF 2 sound frequency generator ( " " " )
- h) Type o6.95ool.1 pulse current meter (VEB "WF" Berlin-Oberschneeweide)
- i) Ternary filter (as above)

**D-11. The correlation of phase and amplitude fluctuation within a statistically inhomogeneous medium NT-6-284-Lit**

by L.A. Tschernow; From "Reports of the Soviet Acad. of Sciences", no. 6, 1954.- The author treats the question of the correlation between amplitude and phase fluctuations at one or more points of reception. It is shown that the correlation extends over a distance lying in the order of large scale inhomogeneities, and that there is also a correlation existing between the inhomogeneities of the medium itself. It finally follows that the factor of correlation decreases with the distance going to zero, so that the correlation between the fluctuations of amplitude and phase existing at low distances does not exist at large distances.

**D-12. Electromagnetic waves within rectangular hollow conductors filled with magnetised ferrite NT-6-285-Lit**

by A.L. Mikaeljan; From "Reports of the Soviet Acad. of Sciences", no. 6, 1954.- Mathematical representation of the propagation of electromagnetic waves within the above type hollow conductors is treated for the case that the direction of magnetization is perpendicular to the longitudinal axis of the conductor. The anisotropy of the medium existing in this case may be characterized by the tensor of magnetic dielectricity. The method of solution used bases on the treatment of partial waves within hollow conductors. This method is more closely described.

**D-13. Modern relays ET-6-202 by Ing. G. Stark, Berlin.-**

By the examination of relay constructions from the viewpoint of fabrication, important improvements have been achieved which have considerably increased economy, at the same time improving the quality of relays. The multitude of relay elements has been reduced to 19 basic units by which the entire program may be covered. The new method is illustrated by several examples.

**D-14. Operating properties of DC motors connected to grid controlled rectifiers ET-6-208 by L. Vitalyos; Condensed from "Elektro-**

technika", Budapest, no. 45, 1952.- The performance of electric motors operated with rectified current instead of true DC is different with respect to mechanical properties and temperature. The additional difficulties resulting therefrom are thoroughly considered, and calculations for pulsing and continuous rectified current are carried out.

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- D-15. Three-phase double-rotor motors cover wider r.p.m. range ET-6-212 by Ing.W.Halt, Berlin.-  
 Numerous drives require revolution rates not to be reached with normal threephase motors. The above type motor may be used for such cases in addition to the possibilities offered by frequency transformers or mechanical transmissions. A short description of the design of double-rotor motors is given, and technical data of two types constructed by VEM factories in the DDR are listed. It is said that the new motors are able to run at 1,500 3,000 4,500 and 6,000 r.p.m. when connected to a 50 cycle main. Diagrams showing the principal features of the new machines are included.
- D-16. Physical fundaments of technical fluid resistors for surge voltages ET-6-214 by Dipl.Ing.W. Mosch; Report from the Institute for High Voltage Engng., Dresden Technological Institute.-  
 Fluid resistors offer considerable advantages on account of their small geometric dimensions and the resultingly low values of inherent capacitance and inductance. Furthermore it is relatively simple to prepare different resistance values without undue expenses. However, since fluid resistors depend on voltage, frequency, polarity, and ~~temp~~ temperature, certain rules must be observed for their application. Such rules for dimensioning fluid resistors with constant properties are listed, and physical facts essential for the use of such rules by engineers are explained.
- D-17. Surge testing methods under special consideration of their application to transformers ET-6-218 by Ing.M.Kondr, Ing.J.Kopecek, and Ing.V.Kuklik, Nilsen, CSR; from "Elektrotechniky Obzor", no.2, 1953  
 The method of the detection of defects by means of surge tests is treated. The different methods are thoroughly discussed, and their applicability to transformer testing is examined. Different oscillographical detection methods are compared. Contribution to be continued in the next number.
- D-18. Variable frequency generating wiring for controlling asynchron motors ET-6-226-Lit by J.N.Sulchanischwilli, USSR.-  
 Description of the mode of operation and of experimental results of the above wiring for the control of squirrel cage armature machines. One wiring diagram is included, and also the fundamental equation for same. It is said that the machines required for setting up the described wiring are conventional types from series production.
- D-19. Spreading of short waves between May April 15 and May 15, 1955 RuF-11, ins.front cover.-  
 Report issued by the Heinrich-Hertz-Institute of the German Academy of sciences, Berlin, including forecast for June and amateur informations, same month.
- D-20. Spreading of radio waves in May 1955 RuF-12, ins.frontcover  
 Monthly report of the Kuhlungsborn observatory, Meteorological and Hydrological Service of the DDR. The report covers long, medium, and ultra short waves.
- D-21. Electron tube information RuF-11-345 by Ing.Fritz Kunze.-  
 Characteristics, technical data, and application range of the 6SH7 tube.

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D-22. New a-m/f-m superheterodyne receiver RuF-11-333

Short description, wiring diagram, data, and views of the above new receiver which has been developed by VEB Stern Radio, Rochlitz.

D-23. Highly accurate short interval electronic timing relay  
RuF-11-336 by Reinhard Heimann.-

The above unit has been developed in the laboratories of VEB Filmwerke Agfa Wolfen for purposes of research in the field of photographic material. The unit is ~~wiki~~ thoroughly described, and the wiring diagram is given. It is said that the accuracy is .5%. Since accurate time relays are used in other places too, it is suggested that further development should be taken over by the respective industry.

D-24. Oscillating quartz production expanded at VEB Werk für Fernmel-  
dewesen, Berlin-Oberschöneweide RuF-11-341

The above factory has now developed small size quartzes of the following types, which are adapted to international standards:

- (a) QDS 12 for 5 to 20 mc
- (b) QLM 7 for 5 to 50 or 80 to 200 mc.

Normal frequency allowances are  $3 \times 10^{-5}$ ,  $5 \times 10^{-5}$  or  $1 \times 10^{-4}$ . Quartzes of increased accuracy may be supplied for special applications, such as carrier frequency systems. Furthermore complete oscillator stages with thermostat and electric supply included, and for an accuracy of  $2 \times 10^{-7}$  per month, are available for normal frequency generators and other top requirements. Filter quartzes are now available for frequencies between 1 kc and 3 mc only. Compression type quartzes and ultrasonic quartzes are also being made by the factory.

D-25. Wide band directional receiving antenna with concentric cable connection RuF-12-356 by Dipl. Ing. Ernst Missler.-

Normal ultra short wave receiving antennas with symmetrical band cables oftentimes give insufficient reception, especially in districts having low field intensity. The author therefore describes an improved design using concentric cable connection and other features which are more closely described.

D-26. Universal unit for radio shop repair and measuring RuF-11-362  
by Helmut Strauss.- This is a thorough description for the

the above unit intended for radio repair shops, amateurs etc. Parts list, wiring diagrams, and numerous views are included.

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Section E.- MACHINE ENGINEERING, GENERAL

E-1. Calculating durability strength MT-6-285 by Erich Beckert, Zeuthen.- Simple calculation examples carried out both after the Bach's strength theory and after modern methods for calculating durability strength under consideration of stress concentration and influence of shape are to demonstrate ~~that~~ the superiority of the second method. It is said that increased economy in material consumption will result from general application of the new principles.

E-2. Differential type grinding gear MT-6-292 Hans Donath, Dresden.- By means of a differential drive the conditions within the clearance between the grinding cylinders have been theoretically and practically solved. The investigations resulted in the construction of a modern type grinding gear which is entirely different from conventional fixed-gear units with regard to the operation mode and the output. It is said that markedly decreased lengths of grinding cylinders, a lower number of passages during the grinding process, and also considerable savings of energy have now become possible. Some diagrams and pictures featuring the principles of the improvement are included.

E-3. Causes and appearance of fatigue fractures MT-6-303 Ing.H.Dittschlag and Ing.Herbert Tauscher, Karl-Marx-Stadt.- After an explanation of the conceptions of continuous stress, the reasons for fatigue fractures, and of the process of fatigue breaking itself, the different types of fracture face appearances resulting from different causes are discussed. Several typical examples of fracture appearances are to demonstrate the principal insufficiencies of design and material treatment responsible for them.

E-4. Resilient forces of air springs MT-6-312 Baurat A.Vogel, Zwickau.- As a completion of an earlier treatment on air type springs, the author adds the calculation of the resilient force  $c$  which is necessary for oscillation calculations of such units. Graphical and analytical determination of  $c$  are explained.

E-5. Calculation of centrifugal type pumps and compressors avoiding sound velocity and cavitation MT-6-313 by Ing. Jancu Marcu, Bukarest.- Basing on the fact that the increasing application of gas turbines in all branches of industry and for aircraft propulsion calls for the construction of turbo blowers and compressors of optimum aerodynamic properties, and capable of producing high pressure with a minimum of stages, the author gives the optimum conditions for the calculation of such units. This is done for the case that the limits set by sound velocity and cavitation are not reached.

E-6. The application of photoelectric control for paper working machinery MT-6-325 by Ing.G.Rösler, Panitzsch.- The author describes the advantages of automatization in the interest of increased efficiency and accident prevention. The elements of photoelectric control are named and discussed in short. Some applications in automatic switching, regulating, counting, and sorting devices are shortly described.

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E-7. Unbalances in series-produced internal combustion engines and torsional oscillations of the crankshaft MT-6-327

by Ing. Cyril Häschi, Sokolovo, CSR; Translated from "Machine Engin.", Prague.- The influence of non-uniform rotation speed of the crankshaft is investigated by analysis. The 'free' forces and moments in series-produced internal combustion engines are determined, and the causes for uneven and noiseful operation as well as the free forces and moments resulting from torsional crankshaft oscillations are discussed. Dampening which affects the transmission of additional inertia moments, is not included in the derived approximate equations since there is little material on the factors influencing the degree of dampening available till now. It is said that complete elimination of torsional oscillations within the operating r.p.m. range is desirable even if the crankshaft and other parts are not endangered.

E-8. Chinese agricultural machines Masch-6-143

Short report, claiming that 520,000 ea agricultural machines and units have been produced by the Peking works for agricultural machines within the last years. This number includes twin ploughs and harvesting machines.

E-9. New printing and paper working machines Masch-6-144

by Ing. H. Schniedewind, Radebeul.- Comprehensive illustrated report on modern polygraphic machines now under production in the DDR. It is said that the machines mentioned belong to the most important export articles of the DDR.

E-10. BWF radial drills - DDR's peak products Masch-6-148

by B. Schmidt, Berlin.- Some technical details of the above line of machines constructed by VEB "Berliner Werkzeugmaschinenfabrik", and the advantages of radials over horizontal boring mills are explained. All spindle speeds and feed speeds of the new radials are controlled through a new 'Hydro' type pre-selecting device. Three pictures are included.

E-11. The "metalock" method for the repair of gray castings MT-6-333 and Masch-6-164

Illustrates description of the above method, which has been developed by L. Scott, USA. It is said that an American company maintaining branches in all capitalistic countries is the only one to profit from the method.

E-12. TECHNISCHES ZENTRALBLATT, Division for Machine Engineering ZM-6 and ZM-7

This publication is monthly issued under the commission of the "Deutsche Akademie der Wissenschaften zu Berlin" (German Acad. of Sc., Berlin). It is a comprehensive compilation of important or remarkable information as offered by technical and scientific publications throughout the world. The individual references include the title or headline both in German and in the original language, name of the author or contributor, short extract of the contents, and complete information as to the source.

The contents is arranged as follows:

- A. General: History, Training, Research, and Fundamental Sciences.

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- B. Plant Operation
- C. Materials, Auxiliary Materials, and Operating Materials of Machine Engineering, and Testing thereof.
- D. Measuring, Testing, and Regulation Technics in Machine Engineering.
- E. Machine Elements, Theory and Manufacture of.
- F. Working Methods, Machine Tools, Devices and Tools,
- G. Machines consuming power.
- H. Heating, Ventilation, and Air Conditioning, Drying Installations and Furnaces.
- I. Power Engines.
- K. Traffic, its Vehicles, Machines and Installations.
- L. Fine Mechanics and Optical Industry, Medical Engineering.
- M. Machines and Equipment for Agriculture, Gardening, Forestry, and Fish Industry.
- N. Applications of Machine Engineering in other Industries: Energy and Water Supply, Chemical Engineering, Textile and Clothes Industry, Building, Mining, Steel and Iron Industry, and others.
- O. Accident prevention, Exhibitions, Fairs, and Classified Meetings.

A list of USA patents as published by "Official Gazette" is separately attached to each of the ZM publications in hand (ZM-6 and ZM-7). It is to be noted that 30 to 40% of the ZM contents of the ZM publications are references to American or English publications in the machine engineering field, and that the minority of the East Block Countries does not only exist with respect to quantity, but also with respect to the quality of the material offered. The sections containing subjects of increased interest and qualification, such as fundamental sciences, research, aeronautics, power engines etc., are almost entirely composed of references of American or Western publications.

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Section F.- WELDING AND PRODUCTION ENGINEERINGF-1. Welding at the 1955 Leipzig Fair Schw-6-161

Continued from Schw-5. General review on welding technics and welding units as exhibited at the above fair. Illustrations and comments on the application of welding for the following: Road vehicle building, naval architecture, boiler and container construction, machine tool and power engine building, agricultural machines and equipment, surface treatment. Two more sections are dedicated to roentgenological testing units and to interesting literature of this field.

F-2. Classify submerged arc welding powders Schw-6-174

Three G.Becker and R.Rieger; Report from the Finsterwalde Institute of the Central Institute for Welding Technics (ZIS) of the DDR.- ~~Two~~ categories are suggested for purposes of designating and classifying non-alloyed powders. The first gives information about the welding properties of the powder, the second designates the alloying effect on C,Mn and Si, and the last category specifies whether AC or DC as well as the range of currents to be used. It is assumed that the suggestions made will help to bring an order in-to the multitude of designations now in use.

F-3. Less acetylene consumed in torch cutting Schw-6-176

W.Schierhorn, Freiberg, Saxony; Report from the Metallurgical and Material Testing Institute, Freiberg Mining Academy.- Acetylene-oxygene and oxy-hydrogen test cuts have been carried out with a normal gas cutting machine of the "Secator" type. Normal carbon steel in thicknesses of 10 to 70 mm was used for the tests, which were made with and without reduced flames. It was found that the reduction of the flame should not be accomplished previous to initiation of the cut with normal size flame. It is said that the surfaces produced by the new reduced-flame method are almost entirely smooth, and that the influence of the cut on the adjoining portions of the material are to those produced by conventional gas cutting. The acetylene of hydrogen saving is 70 to 80%.

F-4. Applications and state of metal spraying (flame spraying)

Schw-6-179 E.Kretzschmar, ZIS Halle-Saale.-

This is the continuation and end of a report which was begun in the April number of Schw. The following applications of flame spraying are treated:

- a) Protecting coatings to prevent oxidation of steel surfaces;
- b) Repair of castings;
- c) Applications in electrical engineering;
- d) Improve appearance by metal spraying;
- e) Die-making;
- f) Heat resistant coatings;
- g) Spray-welding.

F-5. Welding aluminous materials Schw-6-181 Ing.K.Renner, Bitterfeld.-

The author outlines changes of the fine structure suffered by the above materials during the welding process and how they are responsible for the difficulties encountered in aluminum welding. It is said that the welding method employed will influence the seam quality to a large extent.

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F-6. Remote controlled welding current Masch-6-153Ing.W.Kottenhahn, Finsterwalde.-

The economy of arc welding is improved if the operator is able to change the welding current rate without leaving his position. A system is described and illustrated by a principal wiring diagram, at which the excitation of the welding generator is influenced by the operator. If the type of the generator does not allow the regulation this way, electromagnetic remote control may still be employed in most cases.

F-7. Partial hardening through spark discharge FT-6-244Dr.Ing.E.Hanke, Ilmenau.-

After a treatment of earlier publications on the technology of electric spark treatment of hardened cutting tools, it is demonstrated by a number of metallographic grindings that heat action resulting from the high temperature of the sparks and the adherent change of the influenced structure must be considered as the basic process. The zone affected by the treatment contains considerable remaining austenite in addition to the martensitic hardness structure. Thorough investigations have shown that the theory of the formation of hard carbides on the surface of the treated materials must be dropped. It is said that a favourable ratio between martensite and remaining austenite is responsible for the increased durability of treated tools.

F-8. Build-up welding for tools FT-6-251 Ing.R.Walther, Leipzig.-

The article is to familiarize all types of factories with the method of build-up welding, and to give useful assistance in its application. It is said that the method is an effective means for saving considerable quantities of valuable materials. The intended cutting edges of tools made of cheap non-alloyed material is provided with a build-up welding seam of high grade material, and then ground to its final dimensions and/or sharpness. Some illustrations are included.

F-9. Machine tools and tools at the 1955 Leipzig Spring Fair

FT-6-257 Illustrated report on a number of machine tools and tools, including the following:

- a) Semi-automatic turning machines;
- b) Multiple purpose woodworking machine;
- c) Static balancing device;
- d) Electric pipe sawing machine;
- e) Portable machines and electric tools.

F-10. Chipless shaping machines at the 1955 Leipzig Spring fair

FT-6-262 Descriptions, some technical data, and pictures of the following:

- a) Crank type drawing presses up to 7.6 m in height;
- b) Crank type step press;
- c) Tooth wheel spindle press;
- d) Double column type crank press, 1,000 ton;
- e) Double column type knuckle joint press, 1,000 ton;
- f) Single column excenter presses;
- g) 1000-ton billet shears;
- h) Wire drawing machine;
- i) Universal wire bending auto;
- k) Chainmaking machine.

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F-11. Calculating the contents of partially filled horizontal cylindrical containers with convex face walls FT-6-269

Dr.F.Ingrisch, Pardubice-Rybitvi, CSR.-

A method for calculating the contents of partially filled containers of the above type is derived at one example, and a nomogram chart facilitating the solution of any problem of this type is given.

F-12. New unit for wood surface testing FT-6-283

by B.M.Buglaj, cand.of techn.sc., lecturer at the Instt. for Wood technics, Moskow.-

After treating the optical surface testing methods in general, the author describes the design and development of the TSP-2 surface testing unit, which mainly consists of an inclined microscope and a suitable illumination device. Some measuring results are given.

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Section G.- MINING AND ENERGY

G-1. Draining top layers in brown coal open-pit mining BK-4-181  
by Richard Ciesielski, Institute for Open-Pit Mining, Freiberg  
Mining Academy.-

A draining method is suggested and described, at which the drainage galleries are replaced by horizontal bore holes. To introduce this method into mining practice, the following problems are still to be solved:

- a) Horizontal boring machine to be developed which is able to produce boring holes 250 m long, and 1 m in diameter.
- b) Measuring method for accurate location and ranging of horizontal bore holes to be developed. The machine already developed for this purpose by VEB "Präzisionsmechanik Freiberg" must adequately be tested.
- c) Since the vertical drainage bores cannot be accomplished previous to the horizontal ones with the new method, the vertical soil boring methods for depths up to 100 m must be developed to highest directional accuracy.

It is said the the new method may also be applied for brown coal layers of lesser thickness.

G-2. New machines and installations for mining, iron industry, and adjoining fields as exhibited at the 1955 Leipzig Spring Fair BK-4-195 .-

Illustrated report on the following types of machines, including some technical data: Coal combines, shaft driving machines, conveyors and haulage means for mining, other mining equipment.

G-3. VEB 'Elbe' power station, its projection, construction, and operation En-6-242 by Obering. B. Marschewski, VEB Energy projecting, Berlin.-

The treatise describes the special conditions to be observed in the construction of the above named power station, the development of the projecting work, the technical design of the boiler installation, the machine department, and the most important auxiliary installations. A comparison with other power stations is carried out, showing that the Elbe power station is positively modern and therefore gives a good example for DDR's future developments in this field.

G-4. Energy equipment at the 1955 Leipzig Spring Fair En-6-274  
Review on the above exhibition, covering the following:

- a) Mechanic stokers;
- b) Stepless drive for wandering grates;
- c) Solid fuel processing mills;
- d) Steam turbines and generators;
- e) Stationary diesels and steam engines;
- f) Diesel-generator sets.

G-5. Using plastics for gas piping En-6-287 by A. Payer  
Condensed from "Kka Paliva", no. 2, 1954, CSR.-

Tests have been carried out in the CSR about the application of plastics for gas piping. It has been found that Novodur material is best suited since it shows good resistance against the gases of the Brück brown coal district. Furthermore the raw materials for this product are available in sufficient quantities.

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Section H.- APPLIED RESEARCH

- H-1. New universal type glass testing projector FuO-6-172  
by Max Rötisch, German Material Testing Office, Berlin.-  
A new projective method suitable for the examination of defects in glass will replace the former manual-dioptric method. The method also allows the investigation of surface defects (zones and astigmatic lattices) within natural and polarized light. Thorough description of the unit to be expected in one of the next numbers.
- H-2. On the development of electrostatic high voltage generators for 20 to 100 kv ExTP-2-49 by F.Eckardt, Berlin.-  
The operation mode, construction and properties of electrostatic high voltage generators for voltages of 20 to 50 kv are described. These machines are different from known designs in that they show symmetrical wiring, and that the excitator plates are divided through high ohmic resistors. The weight of such a generator for 25 kv is about 170 g (drive weight excluded). Suitable stabilization of the voltages would make it possible to use the new generators in all places where high DC voltages of low power are required, for instance in electrostatic deflection systems. Any predictions as to the significance of this development for DC long range transmission systems would be too early at the present time.
- H-3. A new electrostatic ray condenser and a new five-step lense ExTP-2-58 by E.Mahn, Jena; short report on a lecture held during the Physicists' Conference, Halle, Sept.3/4, 1954.-  
Short description and characteristics of the above ray condenser, which is mainly a further development of the Steigerwald distant focus system. Schematic diagrams of both the original and the improved condenser, and also illustrations of the 5-step lense are included. The lense system is shortly described.
- H-4. Investigations with betatrons for 2.5 and 8 kc ExTP-2-73  
by Dipl.Phys.G.Hentze, Technical-Physical Institute of the Jena University.-  
Report on experiments carried out in the above institute. Difficulties encountered at the development of the betatron for 8 kc are described. The report contains diagrams and pictures of the experimental arrangement, and also counter tube reactions and a photograph of photoelectrons and compton electrons produced by means of the air coil betatron.
- H-5. Observation of magnetic nuclear resonances by means of non-dampened oscillating circuits ExTP-2-83 Dr.Harry Pfeifer, Physical Institute of the Leipzig University.-  
It is theoretically and experimentally investigated whether it is possible to amplify the amplitude of the voltage signal resulting from magnetic nuclear resonance absorption by means of regenerative coupling of the measuring circuit. The experiments have shown that this is possible. The adherent non-linearities, however, limit the enlargement of the noise level distance of the signal.
- H-6. New atomizer for flame type photometers ExTD-2-89  
Prof.Dr.Harald Straubel, Botzstrasse 10, Jena.-  
A new atomizer is described which will replace the less advantageous

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pneumatic atomizers. The new design follows electrostatic principles and does not require compressed air. Its efficiency is close to 100% since the atomized particles are carried into the flame by suitable electrostatic fields. Some illustrations are included.

H-7. USSR will assist "People's Democracies" in atomic energy development RuF-12-351

Short report, saying that agreements have been signed between the USSR and China, Poland, Rumania, CSR, DDR, according to which the Soviet Union will carry out projecting work for these countries in 1955 and 1956. It will also supply atomic piles and other equipment required for atomic research. Furthermore the Soviet Union will train scientists and engineers of the countries concerned, and supply radioisotopes and fissible materials until the atomic piles will be in operation.

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